What is claimed is:

1. A printing device, comprising:

a printing fluid reservoir configured to hold a volume of a printing fluid;

a print head assembly configured to transfer the printing fluid to a printing medium;

a conduit fluidically connecting the printing fluid reservoir and the print head assembly; and

a printing fluid detector including a first electrode and a second electrode configured to detect an impedance characteristic of the printing fluid, wherein the printing fluid detector is configured to distinguish printing fluid from printing fluid froth by taking an impedance measurement across the first electrode and the second electrode and then comparing the impedance measurement to a froth threshold impedance value that is calibrated to a measured printing fluid temperature.

2. The printing device of claim 1, wherein the printing fluid detector is configured to calibrate the froth threshold impedance value to a measured printing fluid temperature.

3. The printing device of claim 1, wherein the printing fluid detector is configured to recalibrate the froth threshold impedance value on a periodic basis.

4. The printing device of claim 2, wherein the printing fluid detector is configured to recalibrate the froth threshold impedance value by determining a measured printing fluid temperature, and then comparing the measured printing fluid temperature to a plurality of predetermined printing fluid temperatures correlated with specific froth impedance threshold values to determine the froth impedance threshold value corresponding to the measured printing fluid temperature.

5. The printing device of claim 4, wherein the printing fluid detector is configured to determine the measured printing fluid temperature by taking a plurality of impedance measurements across the first electrode and the second electrode, calculating a measured statistical deviation of the plurality of impedance measurements, and if the measured statistical deviation is less than or equal to a predetermined statistical deviation threshold, then comparing at least one of the impedance measurements to a plurality of predetermined printing fluid impedance values correlated with specific printing fluid temperatures to determine the measured printing fluid temperature.

6. The printing device of claim 6, wherein the statistical deviation is a standard deviation.

7. The printing device of claim 5, wherein the predetermined statistical deviation threshold is a standard deviation of approximately 3-10%.

8. The printing device of claim 5, wherein the printing fluid detector is configured to compare an average of the plurality of impedance measurements to the plurality of predetermined printing fluid impedance values.

9. The printing device of claim 1, further comprising a power supply configured to produce an alternating signal and to apply the alternating signal to the first electrode and the second electrode.

10. The printing device of claim 9, wherein the impedance measurement is a resistance measurement, and wherein the power supply is configured to supply a signal with a frequency of between approximately 1 kHz and 100 kHz.

11. The printing device of claim 9, wherein the alternating signal is unipolar, further comprising a bipolar conversion circuit configured to form a bipolar alternating signal using the unipolar alternating signal, and to provide the bipolar alternating signal to the first electrode and the second electrode.

12. The printing device of claim 11, wherein the power supply is a first power supply and is connected to the first electrode, and wherein the bipolar conversion circuit includes a second power supply connected to the second electrode and configured to output a unipolar alternating signal to the second electrode.

13. The printing device of claim 12, wherein the unipolar alternating signal output by the first power supply is approximately 180 degrees out of phase with the unipolar alternating signal output by the second power supply.

14. The printing device of claim 11, wherein the bipolar conversion circuit includes a capacitor disposed between ground and the second electrode, and wherein the capacitor is configured to be charged by the power supply and to maintain the second electrode at a potential between ground and a maximum output voltage of the power supply.

15. The printing device of claim 14, wherein the bipolar conversion circuit includes a resistor in series with the capacitor, and wherein a resistance of the resistor is selected in combination with the capacitor to give an RC time constant larger than a period of the alternating signal.

16. The printing device of claim 14, wherein the capacitor is configured to hold the second electrode at a potential approximately one half of the maximum output voltage of the power supply.

17. The printing device of claim 1, wherein the electrodes are configured to be in direct contact with the printing fluid.

18. The printing device of claim 1, wherein the electrodes are disposed at least partially within the conduit.

19. The printing device of claim 1, wherein the electrodes are disposed at least partially within the printing fluid reservoir.

20. The printing device of claim 1, wherein the printing device is a printer.

21. A printing device, comprising:

a printing fluid reservoir configured to hold a volume of a printing fluid;

a print head assembly configured to transfer the printing fluid to a printing medium;

a conduit fluidically connecting the printing fluid reservoir to the print head assembly; and

a printing fluid detector having a first electrode and a second electrode configured to be in contact with the printing fluid, wherein the printing fluid detector is configured to take a plurality of impedance measurements across the first electrode and the second electrode, to compute a calculated statistical deviation of the plurality of impedance measurements, and to compare the calculated statistical deviation to a predetermined statistical deviation threshold to determine whether the conduit contains printing fluid froth.

22. The printing device of claim 21, wherein the calculated statistical deviation and the predetermined statistical deviation are standard deviations.

23. The printing device of claim 22, wherein the predetermined statistical deviation threshold has a value of approximately 3-10 %.

24. The printing device of claim 21, further comprising a power supply configured to output an alternating signal and to apply the alternating signal across the electrodes.

25. The printing device of claim 24, wherein the alternating signal has a frequency of between approximately 1 kHz and 100 kHz.

26. The printing device of claim 24, wherein the alternating signal is unipolar, further comprising a bipolar conversion circuit configured to form a bipolar alternating signal using the unipolar alternating signal, and to provide the bipolar alternating signal to the first electrode and the second electrode.

27. The printing device of claim 26, wherein the power supply is a first power supply and is connected to the first electrode, and wherein the bipolar conversion circuit includes a second power supply connected to the second electrode and configured to output a unipolar alternating signal to the second electrode.

28. The printing device of claim 27, wherein the unipolar alternating signal output by the first power supply is approximately 180 degrees out of phase with the unipolar alternating signal output by the second power supply.

29. The printing device of claim 26, wherein the bipolar conversion circuit includes a capacitor disposed between ground and the second electrode, and wherein the capacitor is configured to be charged by the power supply and to hold the second electrode at a potential between a minimum output voltage and a maximum output voltage of the power supply.

30. The printing device of claim 29, wherein the bipolar conversion circuit includes a resistor in series with the capacitor, and wherein a resistance of the resistor is selected in combination with the capacitor to give an RC time constant larger than the period of the alternating signal.

31. The printing device of claim 29, wherein the capacitor is configured to hold the second electrode at a potential approximately one half of the maximum output voltage of the power supply.

32. The printing device of claim 21, wherein the printing fluid detector includes detector circuitry having a processor operatively linked to a memory containing a set of instructions executable by the processor to compare at least one of the plurality of impedance measurements to a plurality of predetermined impedance values stored in the memory and correlated with specific printing fluid temperatures to determine a measured printing fluid temperature.

33. The printing device of claim 32, wherein the set of instructions are executable by the processor to determine the measured printing fluid temperature if the measured statistical deviation is lower than the predetermined statistical deviation threshold.

34. The printing device of claim 32, wherein the set of instructions are executable by the processor to compare the measured printing fluid temperature to a plurality of predetermined printing fluid temperatures that are correlated with specific printing fluid froth threshold impedances to determine a calibrated froth threshold impedance.

35. The printing device of claim 34, wherein the set of instructions are executable by the processor to periodically redetermine the measured printing fluid temperature and the calibrated froth threshold impedance value.

36. The printing device of claim 34, wherein the set of instructions are executable by the processor to take a new printing fluid impedance measurement after determining the calibrated froth threshold impedance value, and to compare the new printing fluid impedance measurement to the calibrated froth threshold impedance value to determine if the conduit contains printing fluid froth.

37. The printing device of claim 32, wherein the instructions are executable by the processor to compare an average of the plurality of impedance measurements to the plurality of predetermined impedance values.

38. In a printing device having a printing fluid detector that includes a first electrode and a second electrode configured to be in contact with the printing fluid, a method of determining the presence of printing fluid froth between the first electrode and the second electrode, the method comprising:

taking a plurality of impedance measurements across the first electrode and the second electrode;

determining a measured statistical deviation of the plurality of impedance measurements; and

comparing the measured statistical deviation of the plurality of impedance measurements to a predetermined statistical deviation threshold.

39. The method of claim 38, wherein the measured statistical deviation and the predetermined statistical deviation threshold are standard deviations.

40. The method of claim 39, wherein the predetermined statistical deviation threshold is a standard deviation of approximately 3-10 %.

41. The method of claim 38, wherein printing fluid froth is determined to exist between the first electrode and the second electrode if the measured statistical deviation is above the predetermined statistical deviation threshold.

42. The method of claim 38, wherein printing fluid is determined to exist between the first electrode and the second electrode if the measured statistical deviation is below the predetermined statistical deviation threshold.

43. The method of claim 42, further comprising determining a calibrated froth threshold impedance value if the measured statistical deviation is below the predetermined statistical deviation.

44. The method of claim 43, wherein determining a calibrated froth threshold impedance value includes comparing at least one of the impedance measurements to a plurality of predetermined impedance values correlated to specific printing fluid temperatures to determine a measured printing fluid temperature.

45. The method of claim 44, wherein an average of the plurality of impedance measurements is compared to the plurality of predetermined impedance values.

46. The method of claim 44, further comprising determining a calibrated froth threshold impedance value by comparing the measured printing fluid temperature to a plurality of predetermined printing fluid temperatures correlated to specific froth impedance threshold values to determine the specific froth impedance threshold value corresponding to the measured printing fluid temperature.

47. The method of claim 46, further comprising taking a new impedance measurement after determining the calibrated froth threshold impedance value, comparing the new impedance measurement to the calibrated froth threshold impedance value, and determining that printing fluid froth exists between the first electrode and second electrode if the new impedance measurement exceeds the calibrated froth threshold impedance value.

48. The method of claim 46, wherein the calibrated printing fluid froth threshold value is updated periodically.

49. The method of claim 38, further comprising applying an alternating signal to the first electrode and the second electrode.

50. The method of claim 49, wherein the alternating signal has a frequency of between approximately 1 kHz and 100 kHz.

51. The method of claim 49, wherein the alternating signal is unipolar, further comprising forming a bipolar alternating signal using the unipolar alternating signal, and applying the bipolar alternating signal to the first electrode and the second electrode.

52. The method of claim 51, wherein the unipolar alternating signal is a first signal, and wherein forming a bipolar alternating signal includes applying the first signal to the first electrode and applying a second bipolar alternating signal that is approximately 180 degrees out of phase with the first bipolar alternating signal to the second electrode.

53. The method of claim 51, wherein forming a bipolar alternating signal includes applying the unipolar alternating signal to the first electrode while maintaining the second electrode at a potential between a minimum voltage and a maximum voltage of the unipolar alternating signal.

54. The method of claim 53, wherein the second electrode is maintained at a potential between a minimum voltage and a maximum voltage by a capacitor in electrical communication with the second electrode.

55. The method of claim 38, wherein the printing device is a printer.

56. The method of claim 38, wherein the electrodes are disposed at least partially within a conduit configured to transport printing fluid from a printing fluid reservoir to a print head assembly.

57. In a printing device having a printing fluid detector configured to determine a presence of printing fluid froth in a printing fluid delivery system, wherein the printing fluid detector includes a first electrode and a second electrode configured to be in contact with the printing fluid, a method of distinguishing printing fluid from printing fluid froth, the method comprising:

taking an impedance measurement across the first electrode and the second electrode;

comparing the impedance measurement to a froth threshold impedance value that is calibrated to a measured printing fluid temperature; and

if the impedance measurement has a preselected relationship to the froth threshold impedance value, then determining that at least some froth exists between the first electrode and the second electrode.

58. The method of claim 57, wherein at least some froth is determined to exist between the first electrode and the second electrode if the impedance measurement exceeds the froth threshold impedance value.

59. The method of claim 57, further comprising calibrating the froth threshold impedance value before taking the impedance measurement across the first electrode and the second electrode.

60. The method of claim 59, wherein calibrating the froth threshold impedance value includes taking a plurality of impedance measurements across the first electrode and the second electrode, determining a measured standard deviation of the plurality of impedance measurements, and if the measured standard deviation is less than a preselected standard deviation threshold, then comparing an average of the plurality of impedance measurements to a plurality of predetermined impedance measurements correlated with specific printing fluid temperatures to determine the specific printing fluid temperature corresponding to the average of the impedance measurements.

61. The method of claim 59, wherein calibrating the froth threshold impedance value includes comparing the measured printing fluid temperature with a plurality of predetermined printing fluid temperatures correlated with specific froth threshold impedance value to determine the froth threshold impedance value corresponding to the measured printing fluid temperature.

62. A printing device, comprising:

a printing fluid reservoir configured to hold a volume of printing fluid;

a print head assembly configured to transfer the printing fluid onto a printing medium;

a conduit configured to transport the printing fluid from the printing fluid reservoir to the print head assembly; and

a printing fluid detector configured to detect a presence or absence of printing fluid in at least one of the printing fluid reservoir, the conduit and the print head assembly, wherein the printing fluid detector includes a first electrode, a second electrode, and a power supply configured to output a unipolar alternating signal, and wherein the printing fluid detector also includes a bipolar conversion circuit configured to form a bipolar alternating signal using the unipolar alternating signal and to provide the bipolar alternating signal to the first electrode and the second electrode.

63. The printing device of claim 62, wherein the impedance measurement is a resistance measurement, and wherein the power supply is configured to supply a signal with a frequency of between approximately 1 kHz and 100 kHz.

64. The printing device of claim 62, wherein the power supply is a first power supply and is connected to the first electrode, and wherein the bipolar conversion circuit includes a second power supply connected to the second electrode and configured to output a unipolar alternating signal to the second electrode.

65. The printing device of claim 64, wherein the unipolar alternating signal output by the first power supply is approximately 180 degrees out of phase with the unipolar alternating signal output by the second power supply.

66. The printing device of claim 62, wherein the bipolar conversion circuit includes a capacitor disposed between ground and the second electrode, and wherein the capacitor is configured to be charged by the power supply and to hold the second electrode at a potential between ground and a maximum output voltage of the power supply.

67. The printing device of claim 66, wherein the bipolar conversion circuit includes a resistor in series with the capacitor, and wherein a resistance of the resistor is selected in combination with the capacitor to give an RC time constant larger than the period of the alternating signal.

68. The printing device of claim 66, wherein the capacitor is configured to hold the second electrode at a potential approximately one half of the maximum output voltage of the power supply.